FLOOD INSURANCE STUDY

TOWN OF HEBRON, CONNECTICUT
TOLLAND COUNTY

REVISED

MARCH 18, 1991

Federal Emergency Management Agency

COMMUNITY NUMBER 090162

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Flood Insurance Study Effective Date: April 15, 1981 (Flood Insurance Rate Map dated October 15, 1981).

Flood Insurance Study Revised: March 18, 1991

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FLOOD INSURANCE STUDY
TOWN OF HEBRON, TOLLAND COUNTY, CONNECTICUT

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Town of Hebron, Tolland County, Connecticut. This information will be used by the town to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study represent a revision of the original analyses prepared for the Federal Emergency Management Agency (FEMA). The analyses in this revision, except for Judd Creek, were prepared by Roald Haestad, Inc. for FEMA, under Contract No. EMW-88-C-2628. The work for this revision was completed in July 1989. The analyses for Judd Creek were prepared by the U. S. Geological Survey for FEMA, during the preparation of the Flood Insurance Study for the Town of Colchester.

1.3 Coordination

On July 7, 1987, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the Town of Hebron, and Roald Haestad, Inc. (the study contractor) in order to determine the streams to be studied by detailed methods. Coordination with town officials and Federal and State agencies produced a variety of information pertaining to available community maps, flood history, and other hydrologic data.

The Connecticut Department of Environmental Protection, Dam Safety Section, provided hydraulic and hydrologic data on Amston Lake Dam. Vertical control data used to establish the network of elevation reference marks were provided by the U. S. Geological Survey (USGS).

On March 23, 1990, a final CCO meeting was held with representatives of FEMA, the study contractor, and the town to review the results of this study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Hebron, Tolland County, Connecticut. The area of study is shown on the Vicinity Map (Figure 1).

The following flooding sources were studied by detailed methods:

Flooding Source	Limits of Detailed Study
Amston Lake	For its entire shoreline within the community
Amston Lake Brook	From State Route 85 (Church Street) to Amston Lake
Raymond Brook	From State Route 85 to a point approximately 50 feet upstream of Robinson Road
West Branch Fawn Brook	From Slocum Road to the upstream side of State Route 85
Fawn Brook	From State Route 85 to Meetinghouse Road
Judd Brook	For its entire length within the community
Woods Pond	For its entire shoreline within the community

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through July 1994.

All or portions of the following flooding sources were studied by approximate methods: Daly Swamp, Jeremy River, Hope Valley Brook, Judd Brook, Blackledge River, Holbrook Pond, Clubhouse Pond and Merrow Swamp. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Hebron.

2.2 Community Description

The Town of Hebron is located in the southern portion of Tolland County in central Connecticut, approximately 20 miles southeast of Hartford. It is bordered by the Towns of Bolton and Andover to the north; the Towns of Columbia and Lebanon to the east; the Town of Colchester to the south; and the Towns of Marlborough and Glastonbury to the west.

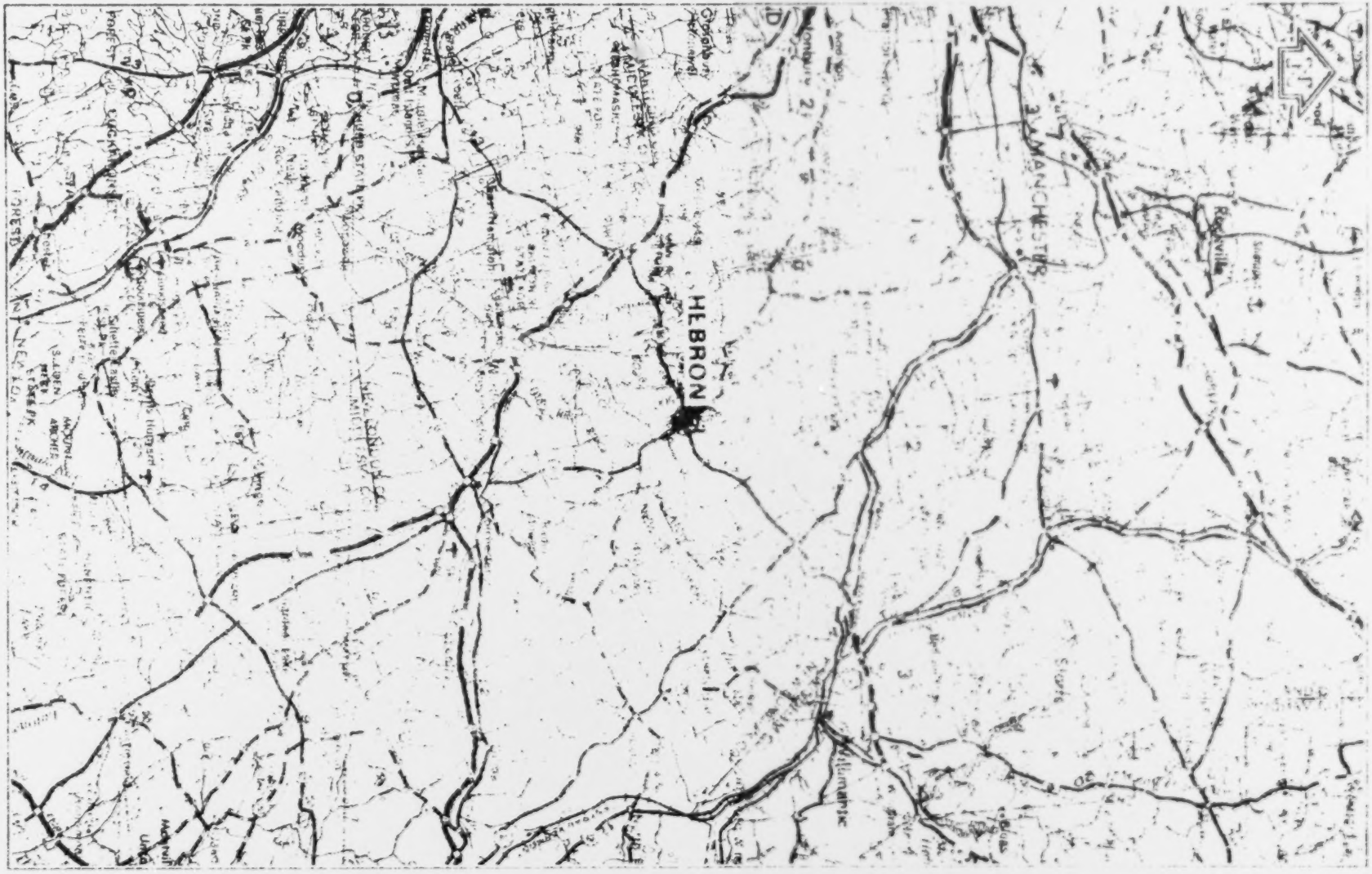


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT

(TOLLAND CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

In 1988 the population of the Town of Hebron was 6,740 (Reference 1). The town covers an area of 37.5 square miles and has a population density of 180 people per square mile. The Connecticut Office of Policy and Management estimates that the population of the town will increase to 7,150 by 1995, 7,400 by 2000, and 9,500 by 2020 (Reference 2).

In the past the Town of Hebron was primarily agricultural, but it is currently developing as a single family residential area. Most of the land within the town is vacant or wooded. Within the floodplains studied, development is limited, consisting of a few single family residences.

Raymond Brook has a drainage area of 5.3 square miles upstream of State Route 85, and drains most of the northeastern section of the town along the corporate limits with Columbia. Amston Lake drains through Amston Lake Brook to Raymond Brook. Amston Lake Brook has a drainage area of 1.3 square miles at State Route 85 (Church Street).

Fawn Brook and West Fawn Brook drain areas in western Hebron. Fawn Brook has a drainage area of 2.8 square miles at State Route 85. West Fawn Brook has a drainage area of 2.9 square miles at Slocum Road.

The climate of the Town of Hebron is moderate and is characterized by the even distribution of approximately 45 inches of precipitation throughout the year. There are large ranges of temperature, both daily and annually, and a considerable variety of weather which can occur in short periods of time. The topography of the Town of Hebron ranges from gently rolling terrain in the river valleys to steep, hilly terrain in several upland areas. The soil was mainly developed on well-drained glacial stratified drift in the valleys. Glacial till and bedrock are found in the uplands.

2.3 Principal Flood Problems

Flooding in the Town of Hebron has occurred in every season of the year. Spring flooding is common and is caused primarily by rainfall combined with snowmelt. Flooding which occurs in late summer and fall is usually the result of hurricanes or other storms moving northeast along the Atlantic coast. Winter flooding results from occasional thaws, particularly in years in which there has been heavy snowfall.

Major floods of the past 50 years occurred in March 1936, July and September 1938, September 1954, October 1955 and January 1979. Stream records at a USGS gaging station on the Hockanum River near East Hartford indicate that the September 1938 flood was equivalent to a flood having a recurrence interval of approximately 100 years. Both the October 1955 flood and the January 1979 flood had a recurrence interval of 50 years. The March 1936, July 1938 and September 1954 floods all had a recurrence interval of approximately 20 years. The most recent flood on the Hockanum River occurred in June 1982 and had a recurrence interval of approximately 25 years at the East Hartford gaging station.

2.4 Flood Protection Measures

There are no flood protection structures in the Town of Hebron at the present time. The large wetlands on Fawn Brook and West Fawn Brook provide natural flood detention. Amston Lake provides substantial flood detention and flood peak reductions for Amston Lake Brook.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

The peak discharges for the streams studied by detailed methods, except Judd Brook, were calculated using regression equations developed by the USGS in cooperation with the Connecticut Department of Environmental Protection (DEP) (Reference 3). The flood flow frequency analysis for Judd Brook followed the log-Pearson Type III method as outlined by the Water Resources Council (Reference 4). Peak discharges were determined by a regression analysis. Discharges were related to basin characteristics such as drainage area, stream length, streambed slope, and rainfall parameters as described in a statewide flood flow formula determination (Reference 5).

Data on the stream length and channel slope were obtained from USGS topographic maps (Reference 6). In addition, data for portions of Raymond Brook and Amston Lake Brook were obtained from topographic maps provided by Fuss and O'Neill Engineers (Reference 7). The percent stratified drift within the watersheds was obtained from a report prepared by the USGS and the DEP (Reference 8). The rainfall

values used in the regression equations were obtained from rainfall distribution maps of Connecticut prepared by the USGS (Reference 9).

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
AMSTON LAKE BROOK					
At State Route 85 (Church Street)	1.27	*	*	170	*
At Outlet of Amston Lake	1.01	*	*	50	*
RAYMOND BROOK					
At State Route 85	5.32	*	*	1,340	*
At confluence with Mint Brook	3.46	*	*	1,040	*
At confluence with unnamed tributary	2.30	*	*	730	*
At confluence with brook from Robinson Pond	1.26	*	*	430	*
WEST BRANCH FAWN BROOK					
At Slocum Road	2.85	*	*	680	*
At confluence with Daniel's Brook	1.45	*	*	400	*
FAWN BROOK					
At State Route 85	2.79	*	*	570	*
JUDD BROOK					
At Old Colchester Road	3.93	300	500	600	900

*Data not computed

The elevation for Woods Pond was calculated using an elevation discharge rating curve. The 100-year peak discharge for Amston Lake was calculated using the Soil Conservation Service's TR-20 computer program (Reference 10). The dam's pertinent information was obtained from field surveys of the dam, the U. S. Army Corps of Engineers (COE) Phase-I inspection Report, and the DEP Dam Safety Section files (References 11 and 12). Rainfall data used in the TR-20 program were obtained from the U. S. Weather Bureau (Reference 13).

The stillwater elevations for the 100-year flood have been determined for Amston Lake and Woods Pond and are summarized in Table 2, "Summary of Stillwater Elevations."

TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 100-YEAR
AMSTON LAKE	
For its entire shoreline within the community	527.3
WOODS POND	
For its entire shoreline within the community	467.4

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross section data for the backwater analyses of the streams studied by detailed methods were obtained by field survey. All bridges and culverts were surveyed in order to obtain elevation data and structural geometry. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals, except for Judd Brook, were computed using the COE HEC-2 step-backwater computer program (Reference 14). For Judd Brook, water-surface elevations were determined using the USGS E431 step-backwater computer program (Reference 15). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for West Branch Fawn Brook, Fawn Brook and Raymond Brook were determined using the slope/area method. The starting elevation for Amston Brook was obtained using a stage-discharge curve prepared for a culvert downstream of State Route 85 (Church Street). Starting elevations for Judd Brook were determined using normal-depth calculations.

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the streams and floodplain areas. The following tabulation shows the channel roughness factors for the streams studied by detailed methods:

Stream	Channel "n"	Overbank "n"
Raymond Brook	0.030-0.060	0.040-0.100
Fawn Brook	0.030-0.060	0.080-0.100
West Branch Fawn Brook	0.030-0.060	0.080-0.100
Amston Lake Brook	0.030-0.050	0.040-0.100
Judd Brook	0.025-0.050	0.060-0.080

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain boundaries to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 6).

For the flooding sources studied by approximate methods, the boundaries of the 100-year floodplain were delineated using the previously printed Flood Insurance Study for the Town of Hebron (Reference 16).

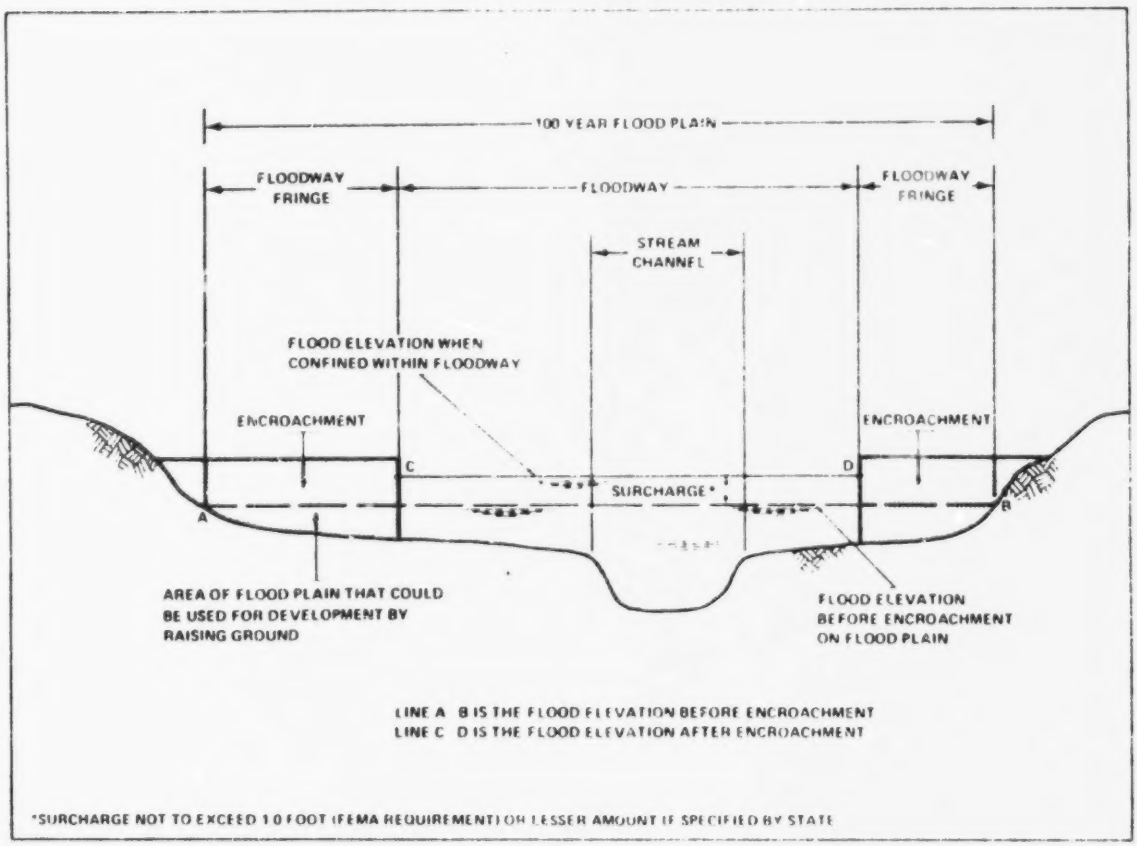
The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program,

a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC Figure 2

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated

with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies have been prepared for the Towns of Lebanon, Colchester, Marlborough, and Andover (References 17, 18, 19 and 20). The results of this study are in exact agreement with the results of those studies.

Flood Insurance Studies have been prepared for the Towns of Columbia and Bolton (References 21 and 22). The results of this study are in general agreement with the results of those studies.

A Flood Insurance Study has been prepared for the Town of Glastonbury (Reference 23). Because of the differences in methodologies used to delineate approximate floodplain boundaries, the results of this study are not in agreement with the results of that study.

Because it is based on more up-to-date and detailed analyses, this study supersedes the previously printed Flood Insurance Study for the Town of Hebron (Reference 16).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, J. W. McCormack Post Office and Courthouse Building, Room 462, Boston, Massachusetts 02109.

9.0 BIBLIOGRAPHY AND REFERENCES

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4. U. S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, Reston, Virginia, Revised September 1981.

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8. U. S. Department of the Interior, Geological Survey, and the Connecticut Department of Environmental Protection, Water Resources Inventory of Connecticut, Part 10, Lower Connecticut River Basin, Hartford, Connecticut, 1982.

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11. U. S. Army Corps of Engineers, Amston Lake Dam, Phase I Investigation Report, Waltham, Massachusetts, June 1979.

12. Connecticut Department of Environmental Protection, Water Resources Unit, Dam Safety Section Files, Amston Land Dam, various dates.

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16. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Hebron, Tolland County, Connecticut, Washington, D. C., April 15, 1981 (Flood Insurance Rate Map dated October 15, 1981).

17. Federal Emergency Management Agency, Flood Insurance Study, Town of Lebanon, New London County, Connecticut, Washington, D. C., June 3, 1988 (currently being revised).

18. Federal Emergency Management Agency, Flood Insurance Study, Town of Colchester, New London County, Connecticut, Washington, D. C., June 15, 1982.

19. Federal Emergency Management Agency, Flood Insurance Study, Town of Marlborough, Hartford County, State, Washington, D. C., May 17, 1982.

20. Federal Emergency Management Agency, Flood Insurance Study, Town of Andover, Tolland County, Connecticut, Washington, D. C., February 2, 1982.

21. Federal Emergency Management Agency, Flood Insurance Study, Town of Columbia, Tolland County, Connecticut, Washington, D. C., September 16, 1982.

22. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Bolton, Tolland County, Connecticut, Washington, D. C., June 1, 1981.

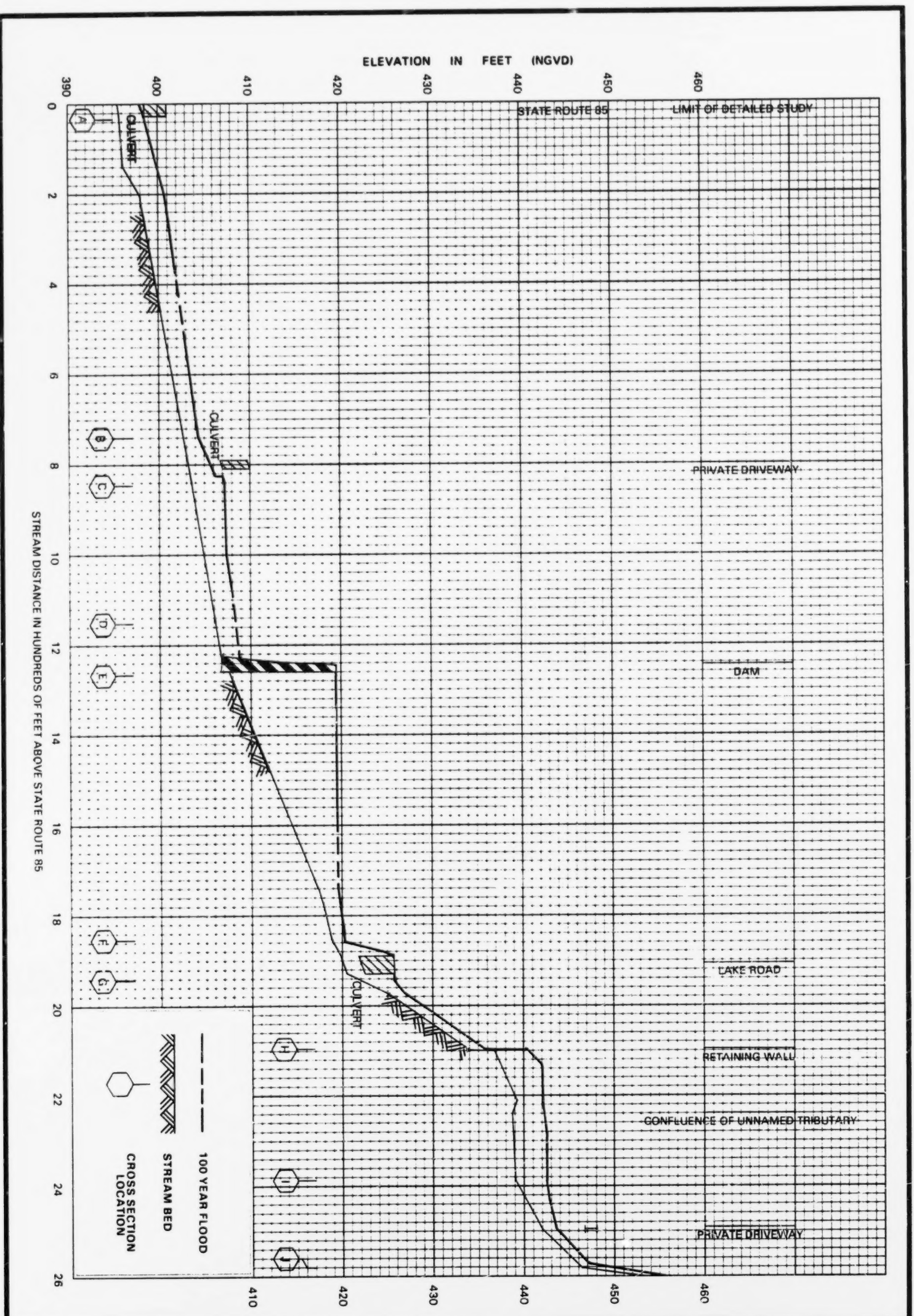
23. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Town of Glastonbury, Hartford County, Connecticut, Washington, D. C., June 15, 1978.

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	05	528.08	PK nail in first pole (CL&P 360) west of West Branch Fawn Brook on south side of Prentice Hill Road.
RM 2	05	475.94	PK nail in root of 18-inch Hickory Tree on north side of Hall Road, approximately 40 feet west on culvert of West Branch Fawn Brook.
RM 3	05	469.39	Chiseled square in southeast corner of downstream endwall on Martin Road at West Branch Fawn Brook.
RM 4	05	429.92	Chiseled square in southeast corner of downstream endwall on Slocum Road at West Branch Fawn Brook.
RM 5	05	467.59	Chiseled square in southeast corner of downstream endwall on Meetinghouse Road at Fawn Brook.
RM 6	05	444.06	Chiseled square in northeast corner of upstream headwall on State Route 85 at Fawn Brook.
RM 7	05	626.24	PK nail in Pole CL&P 1657 on west side of intersection of Robinson Road and Loveland Drive.
RM 8	05	526.95	Chiseled square in southwest corner of concrete parapet wall on south side of Wells Woods Road at Raymond Brook.
RM 9	10	478.16	Chiseled square in southwest corner of headwall on west side of Mill Stream Road at Raymond Brook.
RM 10	10	460.32	Chiseled square in southwest corner of endwall on south side of Kinney Road at Raymond Brook.
RM 11	10	456.35	PK nail in Pole CL&P 2566 in front of house No. 264 Mill Stream Road.
RM 12	10	393.42	Chiseled square in concrete curb at northwest corner of State Route 207 Bridge over Raymond Brook.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 13	10	387.55	Chiseled square in northeast corner of upstream concrete parapet wall on State Route 85.
RM 14	10	399.87	Chiseled square in corner masonry downstream endwall west side of State Route 85 at Amston Lake Brook.
RM 15	10	419.36	Chiseled square in southwest corner of dam on East Side of State Route 85.
RM 16	10	422.15	Chiseled square in southeast corner of endwall south of house No. 598 on west side of State Route 85.
RM 17	10	528.67	Chiseled square in northwest corner of training wall on north side of spillway at Amston Lake Dam.



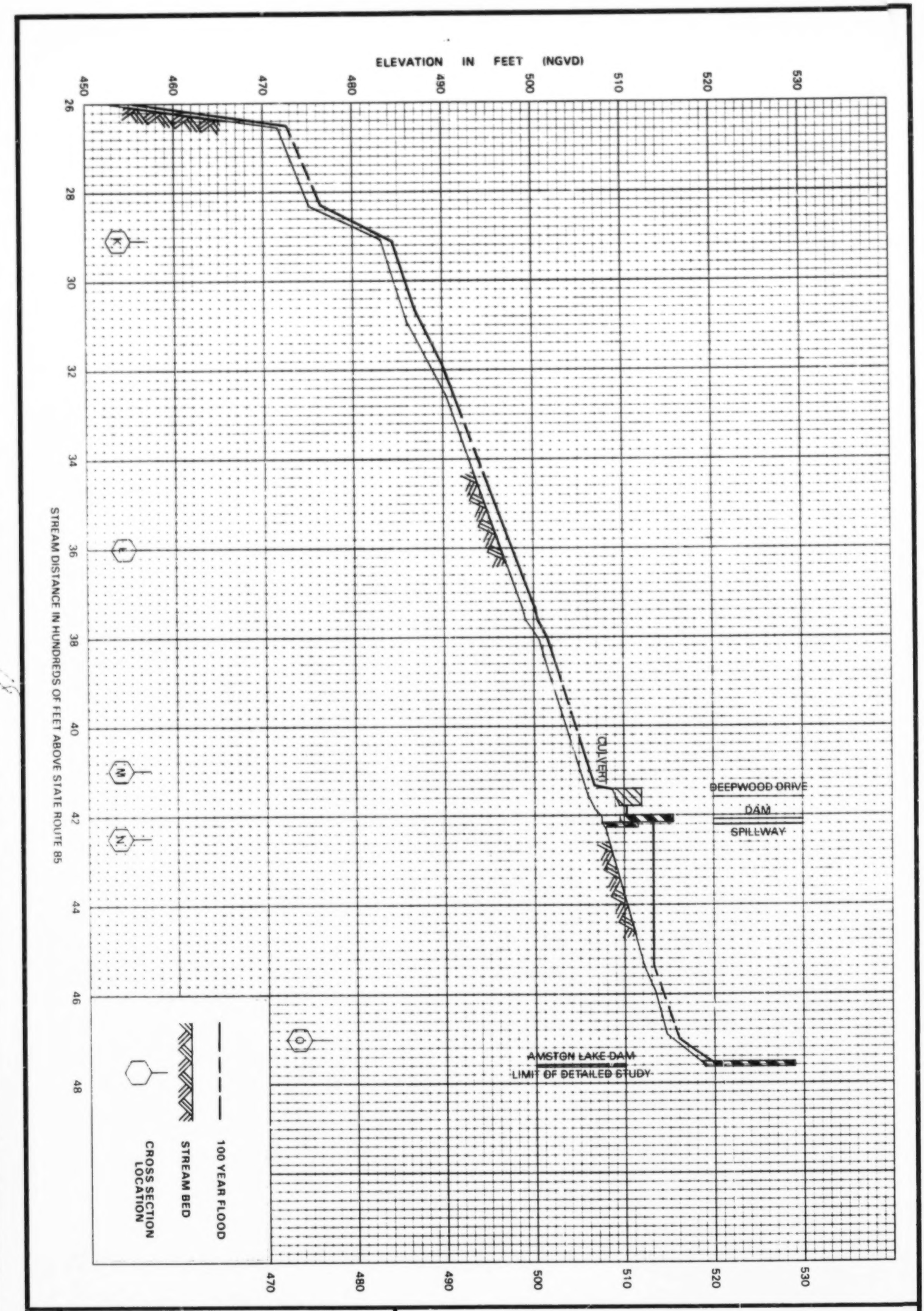
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT
(TOLLAND CO.)

FLOOD PROFILES

AMSTON LAKE BROOK

01P



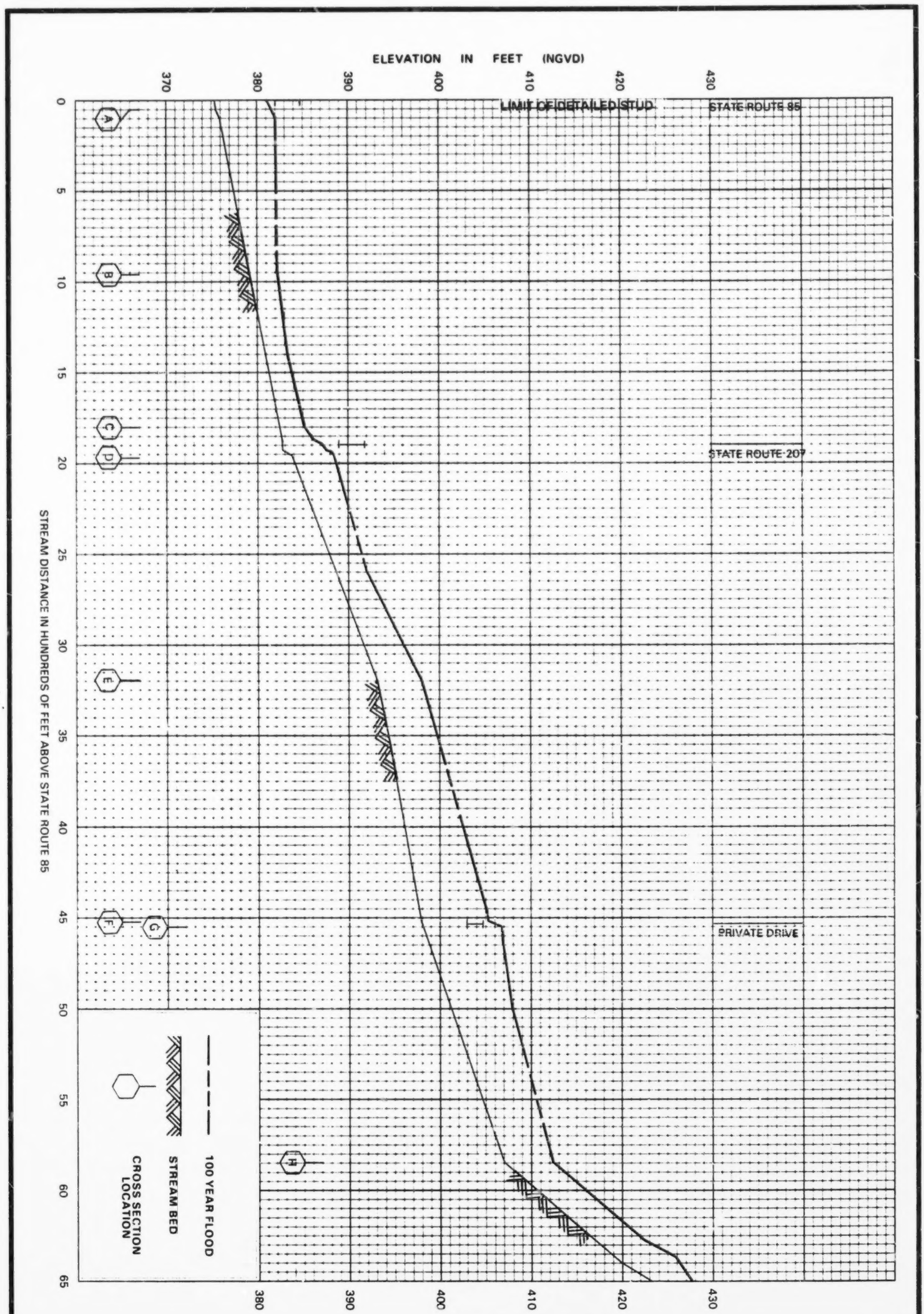
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT
(TOLLAND CO.)

FLOOD PROFILES

AMSTON LAKE BROOK

02P



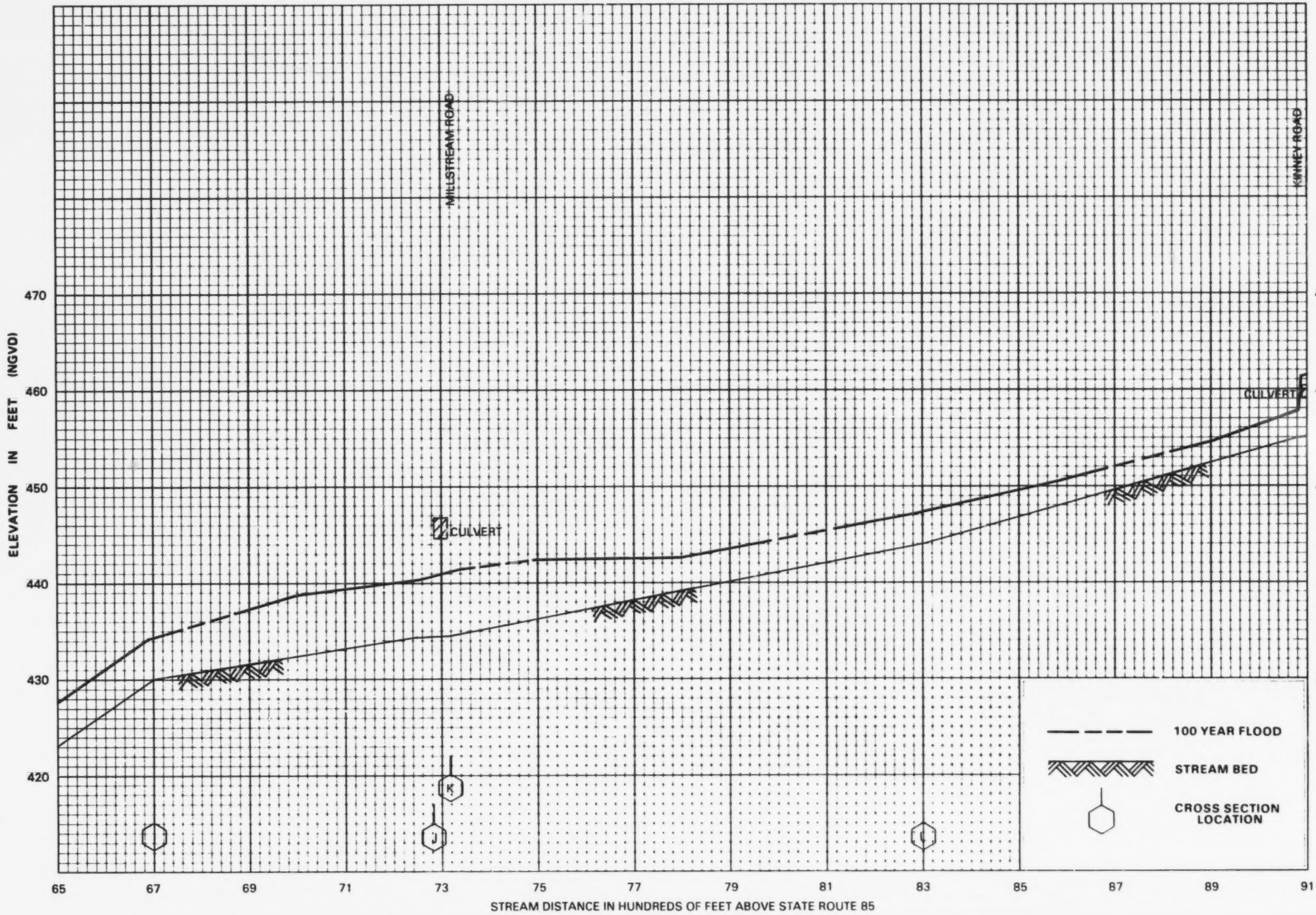
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT
(TOLLAND CO.)

FLOOD PROFILES

RAYMOND BROOK

03P



FLOOD PROFILES

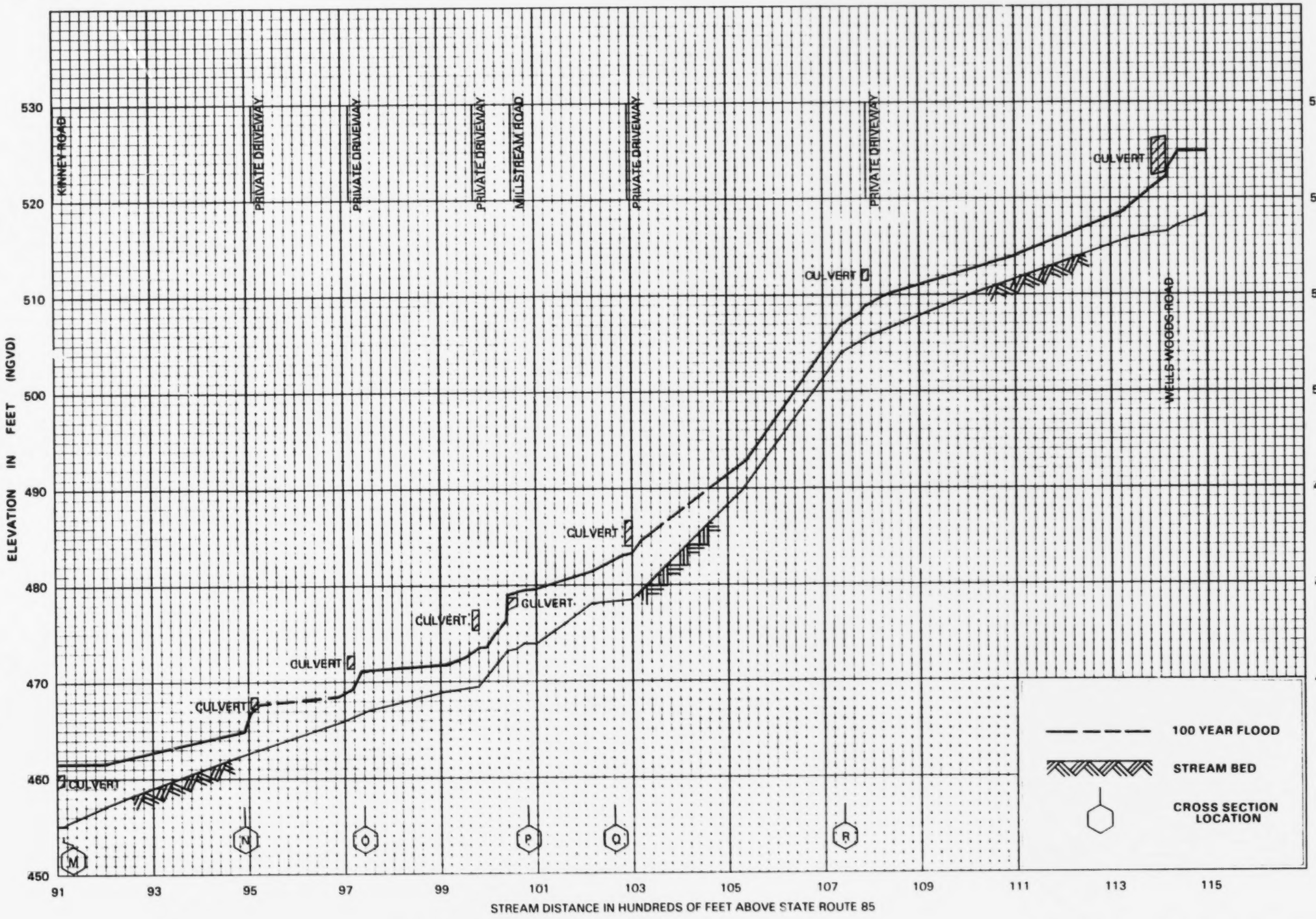
RAYMOND BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT

(TOLLAND CO.)

04P



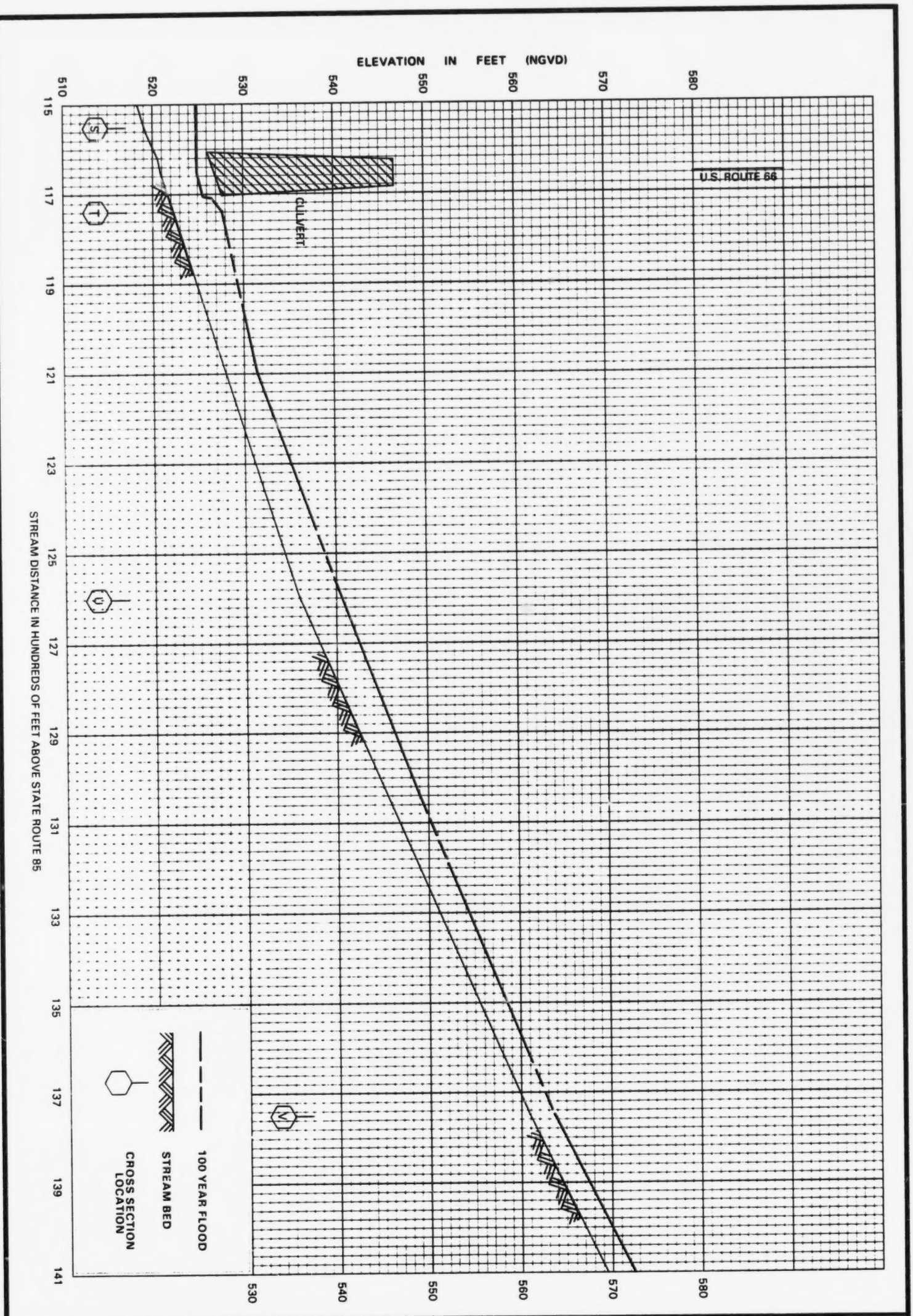
FLOOD PROFILES

RAYMOND BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT
(TOLLAND CO.)

05P



06P

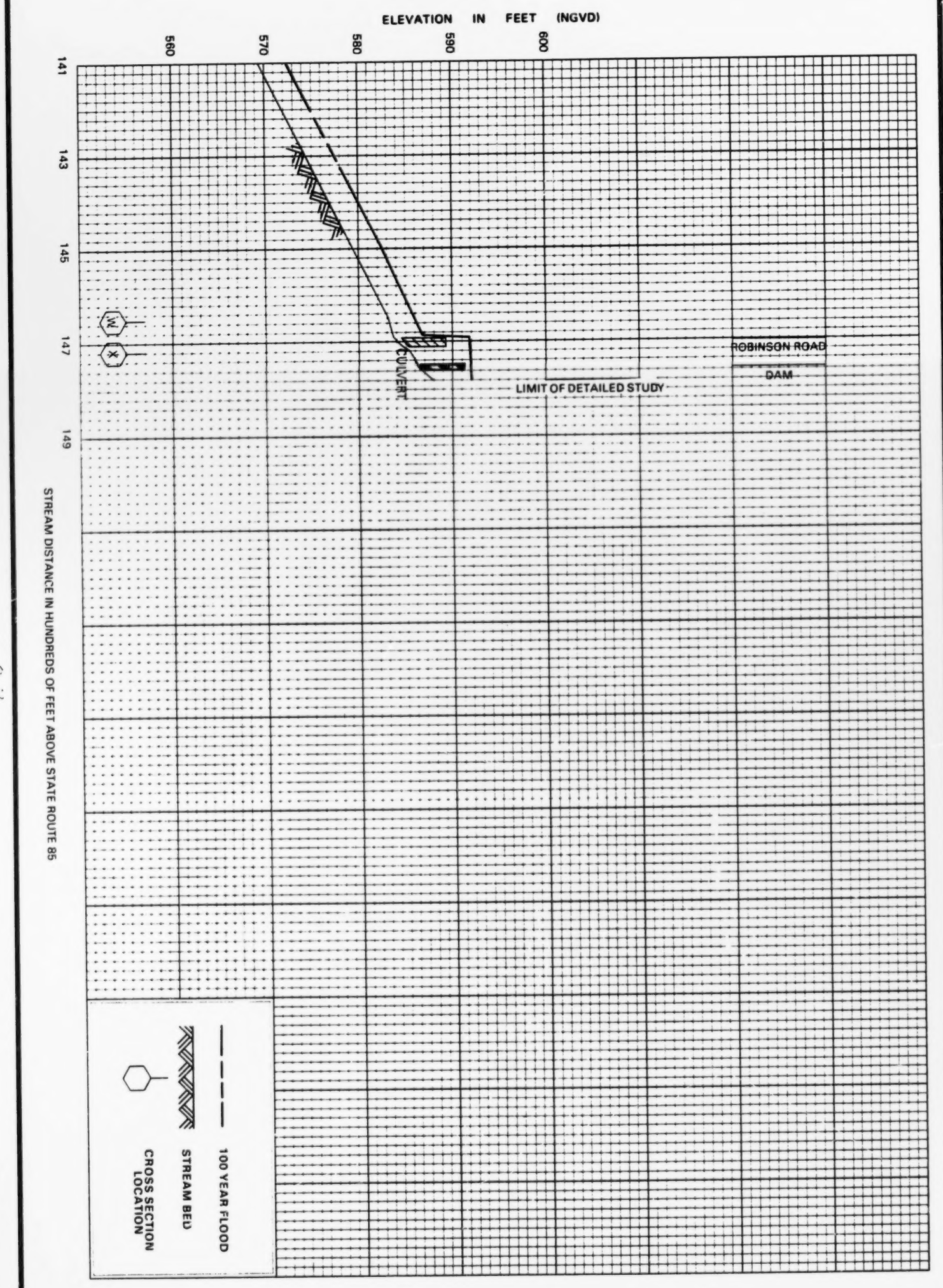
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT

(TOLLAND CO.)

FLOOD PROFILES

RAYMOND BROOK



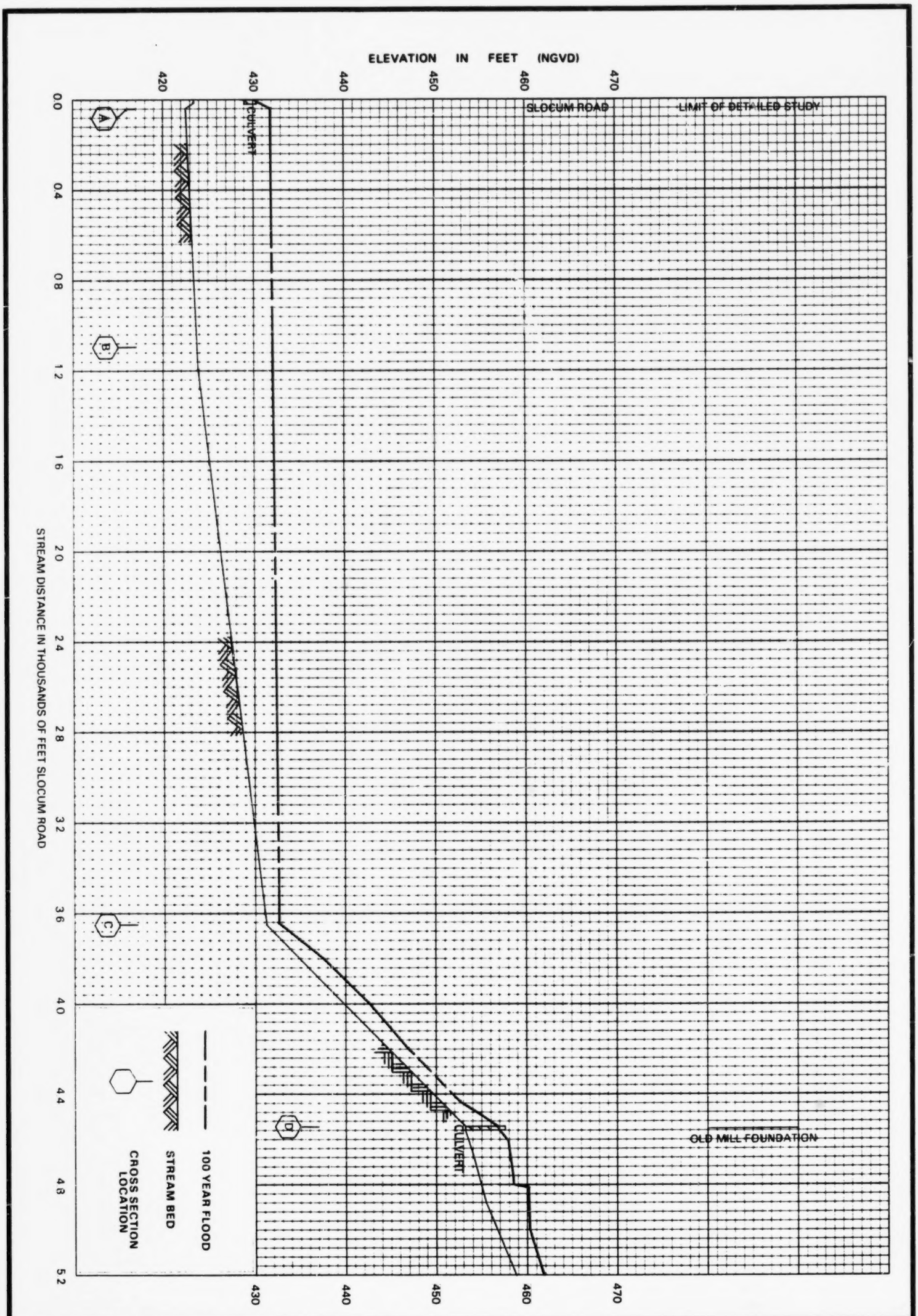
07P

FEDERAL EMERGENCY MANAGEMENT AGENCY

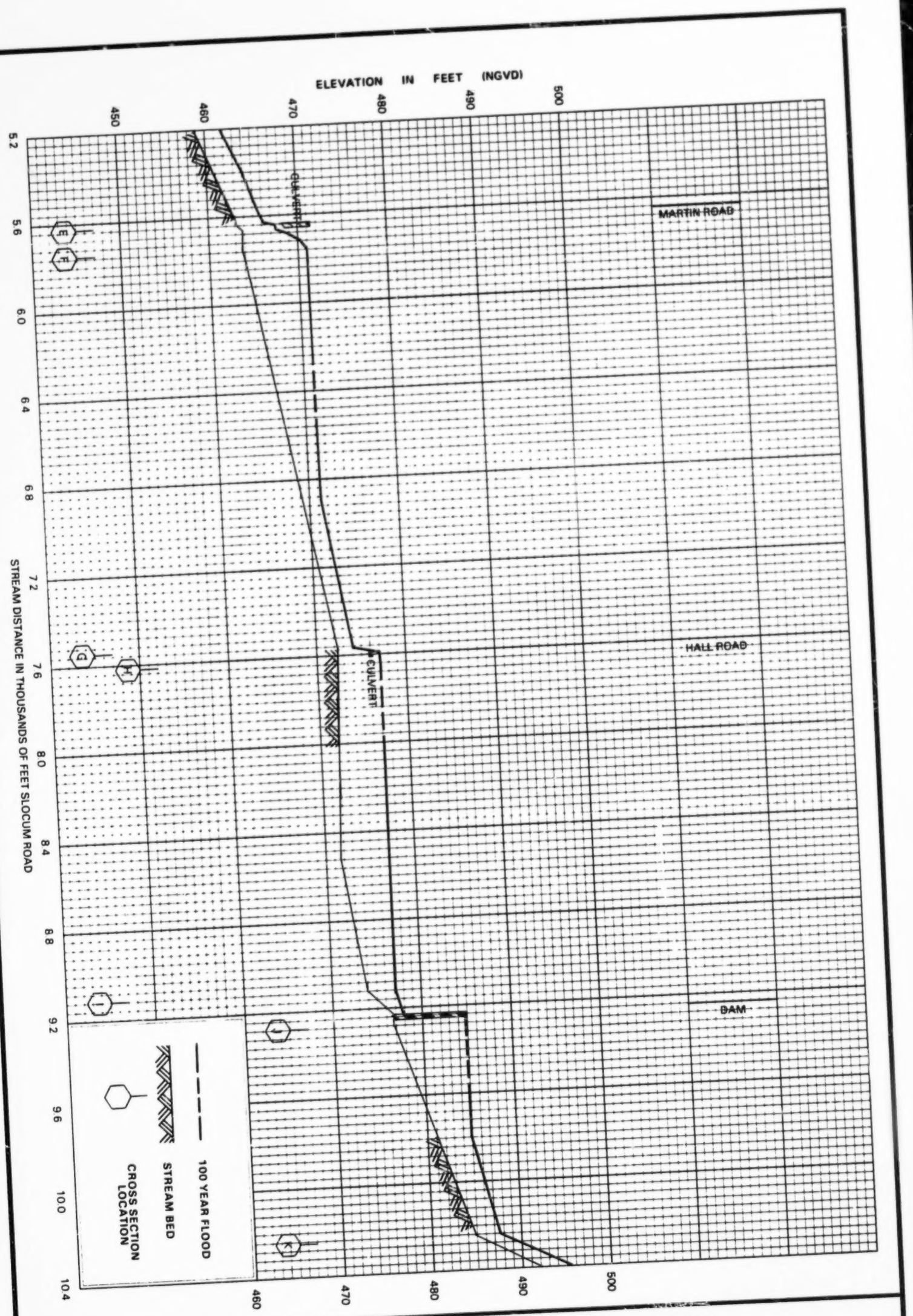
TOWN OF HEBRON, CT
(TOLLAND CO.)

FLOOD PROFILES

RAYMOND BROOK



08P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TOWN OF HEBRON, CT** (TOLLAND CO.)	**FLOOD PROFILES** **WEST BRANCH FAWN BROOK**



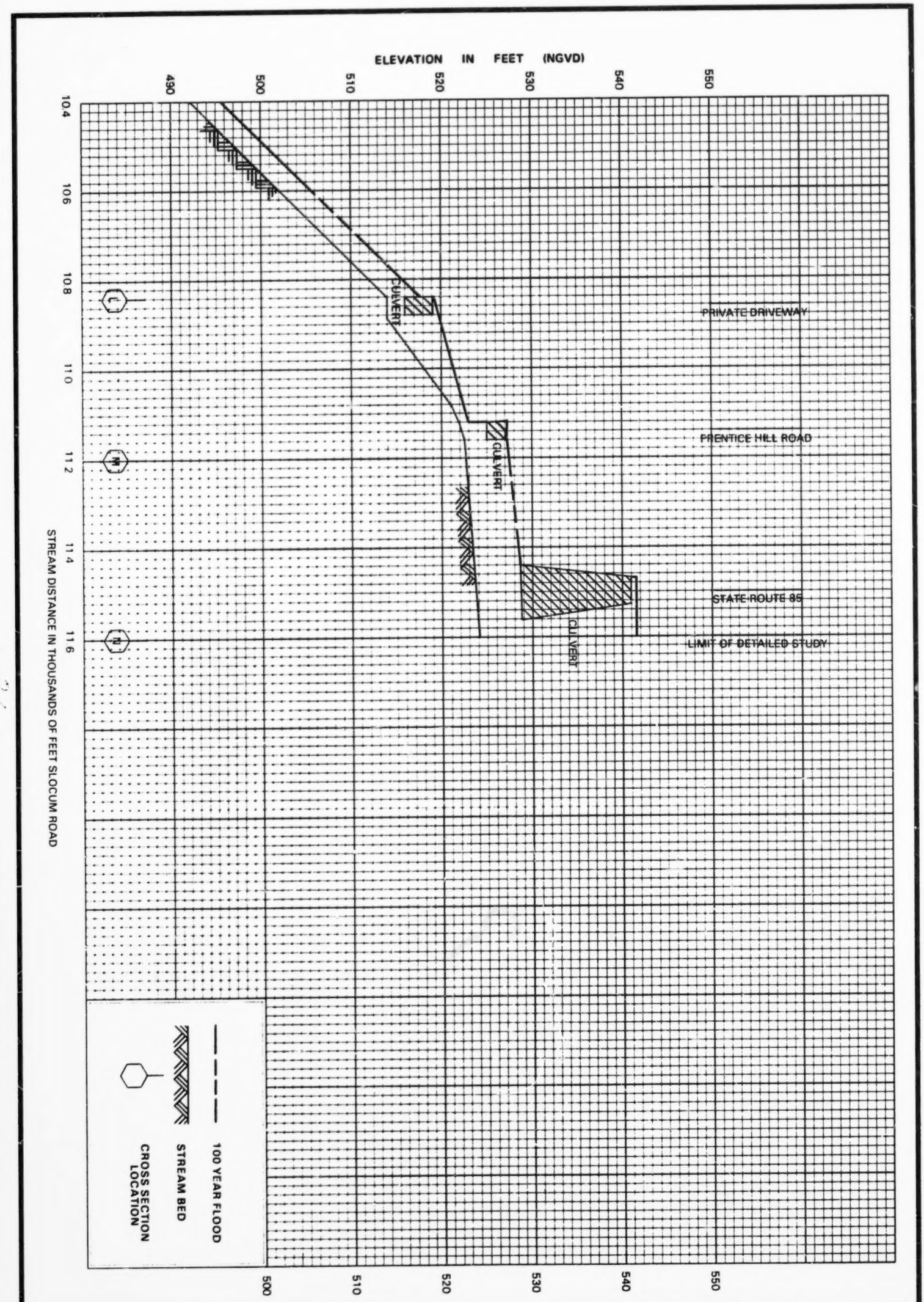
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT
(TOLLAND CO.)

FLOOD PROFILES

WEST BRANCH FAWN BROOK

09P



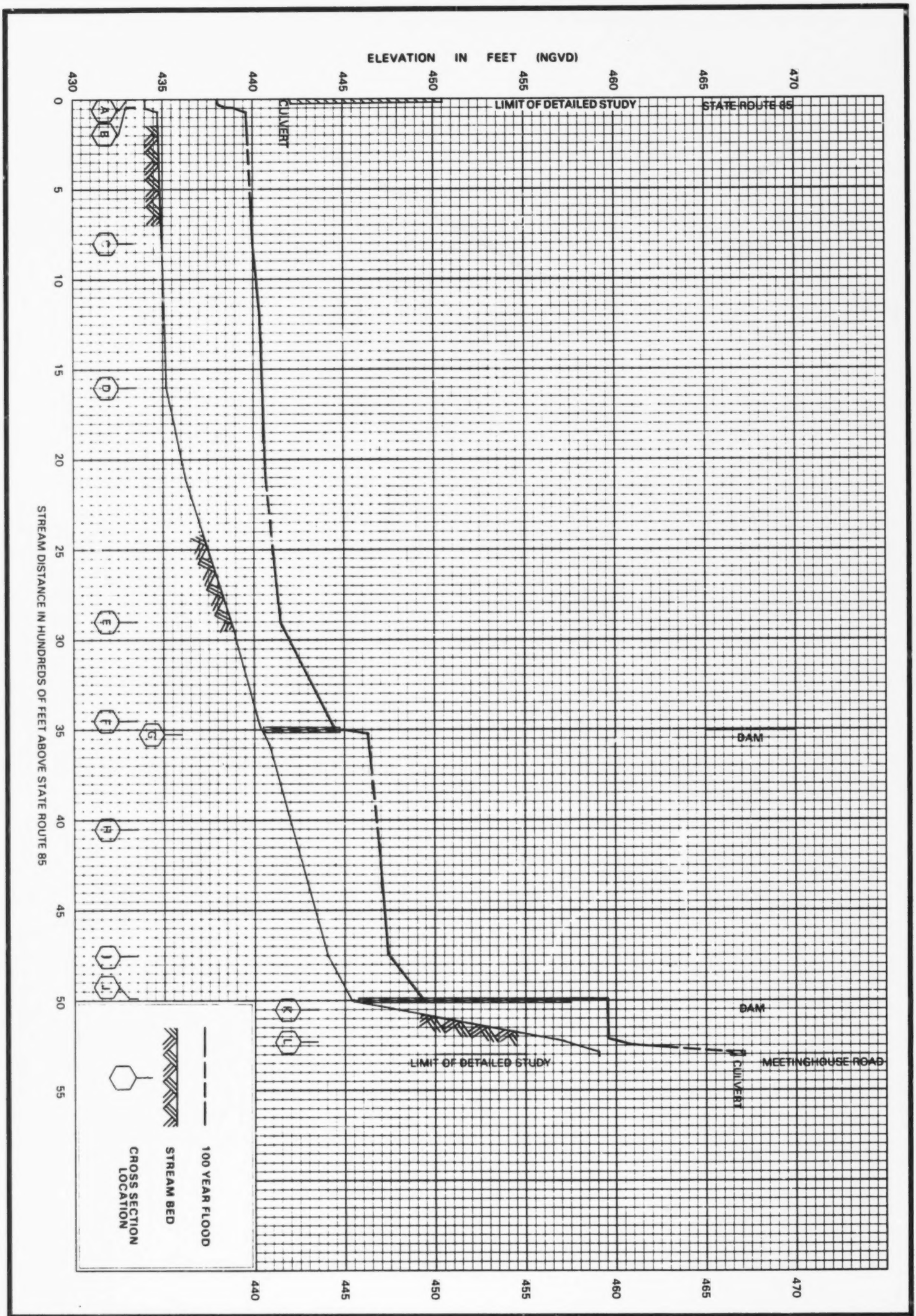
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT
(TOLLAND CO.)

FLOOD PROFILES

WEST BRANCH FAWN BROOK

10P



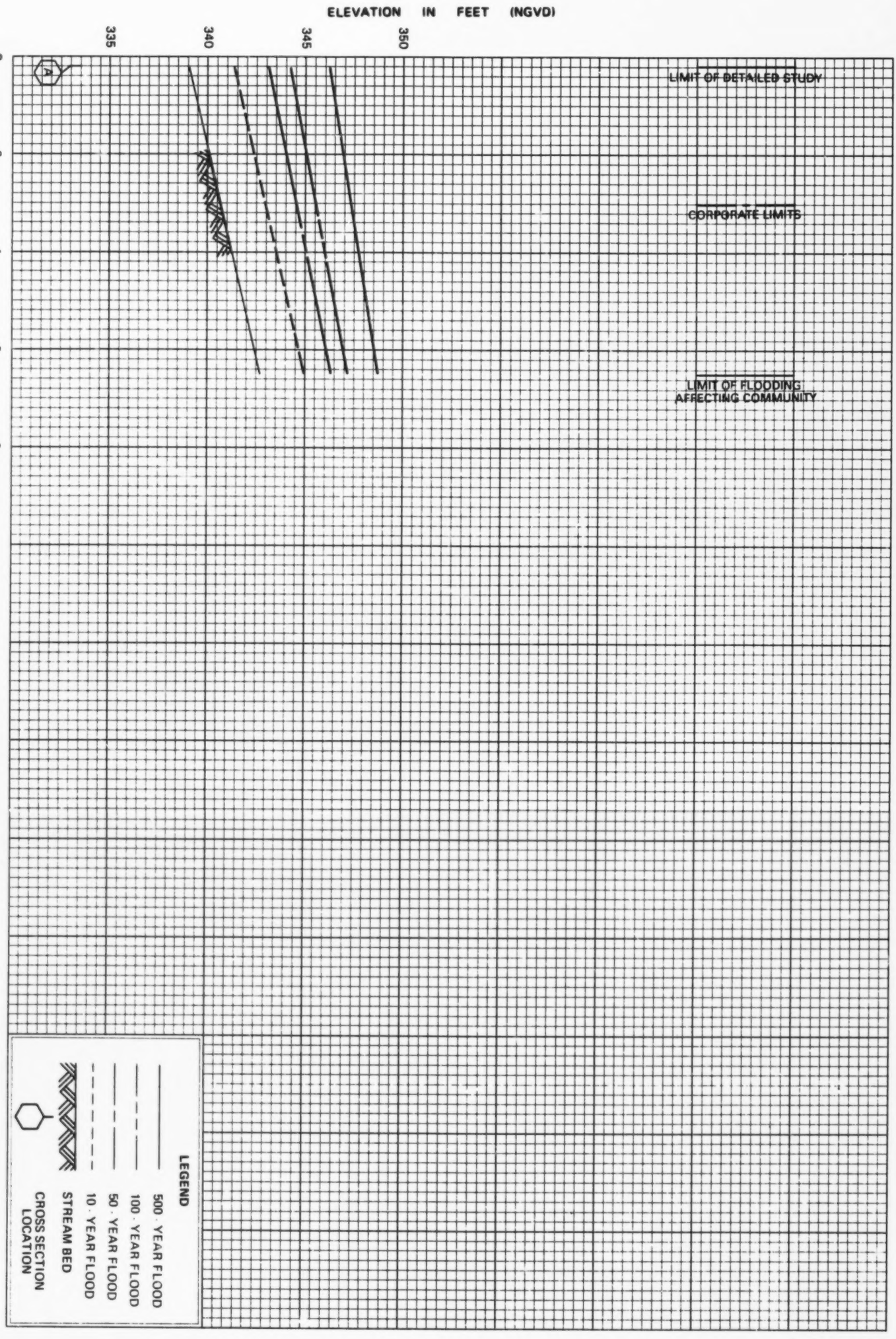
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HEBRON, CT
(TOLLAND CO.)

FLOOD PROFILES

FAWN BROOK

11P



12P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TOWN OF HEBRON, CT** (TOLLAND CO.)	**FLOOD PROFILES** **JUDD BROOK**